REMARKS

Reconsideration of the application is requested.

Claims 1-24 and 26 remain in the application. Claims 1-24 were rejected and claim 26 was objected to as being dependent upon a rejected base claim. Claims 1, 16, and 26 have been amended.

Applicant appreciatively acknowledges the Examiner's statement in "Allowable Subject Matter" that claim 26 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In accordance with the Examiner's suggestion, applicant has rewritten claim 26 in independent form and now believes claim 26 to be in condition for immediate allowance.

In "Claim Rejections - 35 USC § 103" item 7 on page 5 of the above-identified Office Action, claims 1, 4, 7, 8, 10-14, 16, 19, and 22-24 have been rejected as being obvious over U.K. Patent No. GB 2 269 953 A to *Epworth* (hereinafter **EPWORTH**) in view of the publication NRZ vs. RZ in 10-40 Gbit/s dispersion-managed WDM transmission systems, *Optical Fiber Communication Conference and Exhibit*, FEB. 1998, page 407, to *M.I. Hayee, et al.* (hereinafter **HAYEE**) under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103" item 8 on page 7 of the above-identified Office Action, claims 2, 3, 5, 6, 17, 18, 20, and 21 have been rejected as being obvious over **EPWORTH** in view of **HAYEE** and further in view of U.S. Patent No. 5,703,708 to *Das, et al.* (hereinafter **DAS**) under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103" item 9 on page 8 of the above-identified Office Action, claims 9 and 15 have been rejected as being obvious over **EPWORTH** in view of **HAYEE** and further in view of U.S. Patent No. 6,096,496 to *Frankel* (hereinafter **FRANKEL**) under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103" item 10 on page 9 of the above-identified Office Action, claims 1 and 16 have been rejected as being obvious over U.S. Patent No. 3,727,061 to *Dworkin* (hereinafter **DWORKIN**) in view of **HAYEE** under 35 U.S.C. § 103(a).

The rejections have been noted and the claims have been amended in an effort to even more clearly define the invention of the instant application. Support for the changes is found on page 4, lines 18-26; page 14, lines 15-24; page 15, lines 4-12; and page 16, lines 16-18 of the

specification of the instant application. Additional support may also be found in Figures 5 and 6 and the related description in the specification of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, an optical transmitter for generating a digital optical signal sequence including:

> **a plurality of independently drivable light transmitters,** the light transmitters **generating respective optical signals for respective bits of a digital electrical signal sequence,** the respective optical signals having a length, immediately after signal generation, not greater than a length of the corresponding respective bits of the digital electrical signal sequence, the respective optical signals being combined and superposed into an optical signal path; and
>
> **a control device distributing the bits** between the light transmitters, the bits being distributed **sequentially and cyclically** such that **a separate output is generated for each bit** of the digital electrical signal sequence **and before a HIGH state output,** a respective light transmitter **is in a LOW state output for at least one bit period.**

Independent claim 16 contains similar language. More specifically, claim 16 calls for, *inter alia*, a method for generating a digital optical signal sequence, which includes the steps of:

> **generating respective optical signals for respective bits of a digital electrical signal sequence,** the respective optical signals having a length, immediately after generation, not greater than a length of the

respective bits of the digital electrical signal sequence;

distributing bits of an electrical signal sequence **sequentially and cyclically** between light transmitters generating a respective optical signal for each bit of the bits such that before a HIGH state output, a respective light transmitter is in a LOW state **for at least one bit period**; and

combining and superposing each of the respective optical signal generated by the light transmitters in an optical signal path.

In contrast, the **EPWORTH** reference discloses an optical transmission system where outputs of sources 32,33 are multiplexed 34 on a common dispersive transmission path 35 and propagate to a receiver 36. The **EPWORTH** "bits are multiplexed in partially overlapping relationship" but they are dispersed on the transmission path 35 to compress the optical bit representations and remove the overlap before the receiver 36. (see among other locations Fig. 3 and the abstract of **EPWORTH**). More specifically, each laser 33 in **EPWORTH** generates a special "chirped pulse 20" of increased width representing the inverse of a pulse enlarged by dispersion after the transmission path 35 has been applied. Thus the fundamental purpose of the laser 33 in **EPWORTH** is to produce a special pulse that is wider than the length of the corresponding bits.

In contrast to **EPWORTH**, the instant application require the respective optical signals to exhibit "a length, immediately

after signal generation, not greater than a length of the corresponding respective bits of the digital electrical signal sequence" as recited in claim 1. Similar language is found in claim 16. Clearly, the optical signal generated by the optical transmitters in the instant application is not longer than the length of the corresponding bits and as such, unlike **EPWORTH**, the device must not wait until the end of the transmission path to observe the data. This claim language in the instant application explicitly eliminates the overlap expressly described in **EPWORTH**. In **EPWORTH**, the signals present at 34 are each longer than the length of the corresponding bits and thus overlap accordingly. Contrary to the Examiner's assertion, it is only at the end of the transmitting path 35 that the signals in **EPWORTH** have been shortened sufficiently to form a pulse the length of a bit.

Regardless of this distinction, which applicant respectfully asserts existed in the previously submitted set of claims; the amended claims presented above provide an explicit differentiation from **EPWORTH**. Namely, the light pulses generated by the optical transmitters each have a length, immediately after the light generation, which is not greater than the length of the corresponding bits. Thus, the light pulses already have a corresponding short length before being multiplexed. Clearly, Fig. 3 of **EPWORTH** indicates that the

respective optical transmitters 33 generate long pulses that are essentially longer after the light generation that the corresponding bits. As such, **EPWORTH actually teaches away from the claims of instant application.**

Moreover, the applicant respectfully notes that **EPWORTH** appears to only be functional on a defined dispersion transmission path 35 where the fiber length is known. In contrast, the present invention does not require specific dispersion characteristics along the transmission path.

Clearly, **EPWORTH** does not show "light transmitters generating respective optical signals … having a length, immediately after signal generation, not greater than a length of the corresponding respective bits of the digital electrical signal sequence" as recited in claim 1 of the instant application. Nor does **EPWORTH** teach or suggest "a control device distributing the bits between said light transmitters … **sequentially and cyclically** such that **a separate output is generated for each bit** of said digital electrical signal sequence and before a HIGH state output, a respective light transmitter is in a LOW state **output for at least one bit period.**" as recited in claim 1 of the instant application.

HAYEE discloses RZ modulation where the signal is reduced to zero within a bit. Thus, the claimed characteristic found in both claims 1 and 16 that a low state precedes a high state for at least one bit period is not realized during RZ modulation as described in **HAYEE**, because the preceding pulse before a high state output in **HAYEE** falls back into the low state only for approximately half of a bit (the second half) while the pulse remains in the high state in the first half of the bit.

Clearly, the **HAYEE** reference and acceptable combinations thereof do not overcome the previously described deficiencies of **EPWORTH**. Moreover, **HAYEE** does not show "before a HIGH state output, a respective light transmitter is in a LOW state **for at least one bit period**" as recited in claims 1 and 16 of the instant application.

The **DWORKIN** reference discloses a pulse laser communication system. The communication system includes an interface 11 wherein a digital data stream proceeding from a PCM multiplexer 10 is converted into a PPM coded pulse sequence in a PCM/PPM converter 22. The corresponding pulses are then supplied to a plurality of lasers in laser array 20 via multiple driver circuits 19. (See Fig. 1).

Thus, a bit sequence in **DWORKIN** is first modulated according to a pulse-position-modulation (PPM), where each 6-bit PCM word is converted into an individual optical pulse, see column 4, lines 11-22. The coding of the PCM word is performed via the position of the pulses within a defined time slot. Therefore, the temporal position of the pulse defines the value of the PCM word. Traditionally, PPM is a "time slot coding" as described in col. 4, lines 24-46 of **DWORKIN**.

As such, **DWORKIN** describes a configuration where each laser in the laser array 20 sends out a pulse that defines the value of a PCM word (i.e. a plurality of bits) by the temporal position of the pulse within a predetermined time slot.

In contrast to **DWORKIN**, the present invention **sequentially and cyclically** generates a separate optical signal for each bit of a pulse sequence by the corresponding transmitter. Thus, it is not bit groups each representing a word as described in **DWORKIN**, but rather each individual bit is distributed to a transmitter and for each bit, a separate optical signal is generated. A significant advantage of the configuration described in the claims of the instant application over **DWORKIN**, is that the present invention

preserves the existing coding sequence. As the optical signals of the individual optical transmitters are composed in their original sequence, no additional code conversion is necessary in the transmitter or receiver.

Clearly, **DWORKIN** requires PPM coding in the transmitter as well as the receiver. The coding combines bit groups to a PPM pulse, respectively. The corresponding coder or decoder are illustrated in Fig. 1 of **DWORKIN** by reference number 22 at the transmitter and 35 at the receiver. The decoding process is described in col. 6, line 61 to col. 7, line 35 of **DWORKIN**.

DWORKIN, **HAYEE**, and acceptable combinations thereof do not overcome the previously described deficiencies of **EPWORTH**. Moreover, **DWORKIN** is more costly and fundamentally differs from the methods used in the instant application.

Clearly, **DWORKIN** does not show "a control device distributing the bits between said light transmitters … **sequentially and cyclically such that a separate output is generated for each bit of said digital electrical signal sequence** and before a HIGH state output, a respective light transmitter is in a LOW state **output for at least one bit period**" as recited in claim 1 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1, claim 16, or claim 26. Claims 1, 16, and 26 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1 or claim 16.

In view of the foregoing, reconsideration and immediate allowance of claims 1-24 and 26 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

Petition for extension is herewith made. The extension fee for response within a period of two months pursuant to Section 1.136(a) in the amount of $420.00 in accordance with Section 1.17 is enclosed herewith.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith

should be charged to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

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